this intensely practical problem is an excessively difficult one, requiring for its successful prosecution no small expenditure of time, labour, thought, and money.

NOTES

THE Royal Society at their last meeting elected the following five *savants* foreign members:—Anton de Bary (Strasburg), Carl Gegenbaur (Heidelberg), Leopold Kronecker (Berlin), Rudolph Virchow (Berlin), Gustav Wiedemann (Leipzig).

WE are informed that it has been arranged that Sir William Thomson will give, at Johns Hopkins University during the first twenty days of October next, eighteen lectures on "Molecular Dynamics."

CAPTAIN W. J. L. WHARTON, R.N., at present in command of H.M. surveying vessel *Sylvia*, has been selected to succeed Capt. Sir F. Evans, K.C.B., as Hydrographer to the Navy.

ON Tuesday afternoon, at Oxford, Convocation witnessed in the Sheldonian Theatre the most exciting scene that has been enacted in the University since the opposition to Dean Stanley as Select Preacher. Last summer Convocation passed by a small majority a vote of 10,000*l.* for a new physiological laboratory. The vote was opposed by the anti-vivisectionists and by some on the ground of economy. A memorial got up by Mr. Nicholson against vivisection having produced no effect on the Council, the opponents of Prof. Burdon Sanderson determined to oppose the decree brought before Convocation on Tuesday for empowering the sale of stocks for the 10,000*l.* voted last June. The decree was supported by the Dean of Christchurch, Dr. Acland, and the Warden of Keble, and was opposed by Prof. Freeman and Mr. Nicholson. After a stormy debate the vote was carried by 188 votes against 147. The result was received with enthusiasm, and Oxford is to be congratulated on it. To what shifts Dr. Sanderson's opponents were put may be seen from what the *Times* calls "the most astonishing speech" of Mr. Freeman the historian, "who afforded a curious example of the confusion of thought into which even intelligent men may be led by an over-indulgence in sentiment. It would be as reasonable, said Mr. Freeman, for the historian to illustrate the festivities of Kenilworth by an actual bull-baiting as for the physiologist to experiment upon living animals. Mr. Freeman, in his zeal to establish the scientific character of the historian, forgets the difference between description and discovery, and ignores the fact that the physiologist, at least under the existing law, makes his experiments not for the instruction of pupils, but with a view to discover what is as yet unknown. A more curious article in the indictment against vivisection we have not met with since the celebrated letter in which Sir George Duckett told the Royal Commission that he had no evidence to give, but that he considered vivisection 'an abomination introduced from the Continent going hand in hand with Atheism.'" The *Times* in its leader on the subject treats it sensibly and moderately. "All those who are open to argument have been long ago convinced that science cannot proceed on her beneficent way without the aid of experiments, some of which must be painful; and those who are not open to argument, and those who believe, like some of the wiseacres whose opinion is on record, that 'medical science has arrived probably at its extreme limits,' are not likely to be convinced by anything that can be said or by any facts that can be brought against them. Parliament, on the recommendation of one of the strongest Royal Commissions ever appointed, has legislated in the matter, and physiological experiment is now under limitations as severe as it is possible for it to be consistently with any kind of progress in discovery. Abuses are of the rarest occurrence. Men like Dr. Sanderson are not only humane, but they are conscious that public opinion is awake on the matter, and their discretion as to what should be done and what should not is absolutely to be trusted. It is to be hoped that the sensible action of Convocation will not only encourage the Waynflete Professor to proceed as his scientific conscience may guide him, but will convince the well-meaning but irrational opponents of scientific freedom that further action on their part would be not only vexatious but unsuccessful."

BY the election of Dr. J. H. Gilbert to the separate chair of Rural Economy, Oxford has gained a man of European reputation, whose advent to the professoriate all parties will welcome.

DR. P. P. C. HOEK, of Leyden, writes to inform us of the death of Prof. Dr. H. Schlegel, Director of the Royal Museum of Natural History at Leyden, on January 17 last. Schlegel was born in 1804 in Altenburg (Saxony). It was intended to make him a brazier, but on his paying a visit to Vienna about 1824, his love for natural history was awakened. He came to Leyden in 1825, and tried to obtain an appointment as traveller for the Museum of Natural History, of which Dr. Temminck was then superintendent. He did not receive that appointment, but stayed in the Museum as preparator. He remained in this position until he was nominated conservator in 1839. He was appointed to the post of Director of the Museum in 1858 after the death of Temminck. Schlegel was doctor *honoris causâ* of the Leyden University, member of the Royal Academies of Sciences of Amsterdam and Berlin, &c. The Leyden Museum of Natural History, well known to every zoologist, has become under Schlegel's superintendence one of the richest in existence. For descriptive zoology, and especially that of the vertebrata, (reptiles, birds, and mammals), Schlegel was a first authority; the number of papers and monographs published by him in these groups is very considerable, and their scientific importance great.

THE death is announced of M. Richard Cortambert, *fils*, at the age of forty-eight years. He was attached to the geographical department of the National Library, and, in company with his father, had published many geographical works.

ADMIRAL MOUCHEZ read a paper before the Paris Academy of Sciences at the sitting of February 4, in which he stated that it was impossible to make any observations with large instruments in the old establishment at present the headquarters of French astronomy. He proposes to erect a new observatory on a site in the vicinity of Paris. Admiral Mouchez states, moreover, that to find the money required it would be advisable to sell the new grounds which were annexed to the Observatory in the time of Leverrier. The extent of this land is about 28,000 square metres, and the Admiral states that the sale might realise 4*l.* per metre. This ground was given to the Government by the City of Paris, which sold it for the nominal price of 4*l.*; it is supposed that the Municipal Council will oppose the scheme, which has come to light quite unexpectedly.

BY the last mail from Iceland we have received a communication from Dr. Sophus Tromholt, dated Reykjavik, middle of December, in which he informs us that the weather had till then been mild and very unfavourable for his researches, in consequence of which he defers to the next mail giving to NATURE an account of his studies in the island. By the same mail apparently the reports which have lately been circulating in the Scandinavian press of terrific eruptions in the island have also arrived. It is stated in private letters that in November two enormous columns of smoke were seen in the direction of the great Vatnajökull, and that ashes had fallen in the Seidisfjord. According to the direction it seemed as if this eruption was far more easterly than that occurring in the spring. In connection herewith it may be of interest to call attention to the note published in NATURE (vol. xxix. p. 135), in which it is reported that on the night of

November 17 the snow in the valley of Storelo, in Central Norway, between 61° and 62° N., became covered with a layer of gray and black dust. It is, however, remarkable that Dr. Tromholt's communication contains no reference whatever to any volcanic eruption.

WITH reference to the Krakatoa eruption, Prof. Alph. Milne-Edwards read at the Paris Academy of Sciences, on January 28, a letter from a correspondent in Réunion, in which it is stated that the intensity of the sky-tints was always greatest where the showers of volcanic ashes had been observed. Thus the path of the volcanic cloud can be traced step by step, and its trajectory found to be that of an ordinary cyclone. M. Wolf showed how a study of the curves registered by the barometer establishes two atmospheric waves starting at the same time from Krakatoa, one towards the east and the other towards the west; the former to reach us had to traverse 11,500 kilometres, and the latter 13,500. M. Wolf showed that the rate of progress was that of sound, and on the basis of this and the distances, he found the eruption to have taken place on August 27, at 11h. 43m. a.m.

THE Birmingham Town Hall was crowded on Sunday night, January 27, to hear a lecture from the Rev. W. Tuckwell on "Natural History for Working Men." He dwelt upon the difference between the homes of the working man and his employer, the first being destitute of the beauty and the resource with which the latter overflowed. One resource at any rate he could recommend to them in the study of natural history. Illustrations were drawn from the modification of the sap in their window-plants, the rise of the fluid in their trees, the structure of the spiders' webs on their walls, the transformation of insects in their water-butts; from the heavenly bodies within their gaze, Mars with his polar ice-caps, Jupiter with his moons, the sun with his spots, the moon with her craters, the nebular clusters, and the falling meteorites, to show that enveloping and pressing on us everywhere were miracles of creative and developing energy, surpassing a thousandfold the wonders of human enterprise, and that we walked amongst them unheeding and uninquiring. Instances were given of working men who had been discoverers and happy workers in these subjects, some unknown to fame, others, like Charles Peach, Robert Dick, and Thomas Edwards, the heroes of widely read memoirs. Instructions were detailed for setting up aquariums, collecting fossils and insects, preserving plants, stuffing birds, buying microscopes or telescopes with one year's saving from the public-house. A good museum should be examined; and a visit to Oxford on the next bank holiday was proposed. Annual *soirées* were recommended, at which the collections and constructions of the past year might be exhibited. The lecture ended with a few words of religious feeling arising out of the subject, which were received with deep sympathy by the audience. Thanks were proposed by Mr. Jesse Collings, M.P., Mr. Lawson Tait, and Rev. E. F. MacCarthy. The lecture will shortly be published.

IN connection with the forthcoming International Health Exhibition, it is desired to illustrate as far as possible the relations of meteorology to health, and for this purpose a special sub-Committee has been formed. It is hoped that the Royal Meteorological Society will establish a typical climatological order station, provide the complete equipment, and supervise the same. This will be arranged on a level grass space about thirty feet square, which space will be railed in, and provided with a gate through which a limited number of the public can from time to time be admitted. The attendant will take daily observations from the instruments, which will be exhibited in diagrams, and a copy of them furnished to the editorial department of the Exhibition, for publication in the daily programmes and also as a *communiqué* to the press. It is hoped that a series of large diagrams illustrative of the climatal conditions prevailing in various parts of the world may be exhibited. Besides the collective exhibit above described, space will be provided for the exhibition of instruments by manufacturers, inventors, and others who may desire to show them. Attention is particularly directed to the fact that the Committee specially invite the exhibition of meteorological instruments bearing upon the relations of climatology to public health. The Committee also appeal to authors of papers upon the relations between health and disease, rainfall, percolation, evaporation, and flow from ground, and other subjects embraced by the Exhibition, and invite them to exhibit diagrams, models, and apparatus illustrative of their researches.

BULLETIN No. 3 of the Entomological Division of the U.S. Department of Agriculture (Washington, 1883), when stripped of the "red-tape" that appears to be even more necessary on official documents in the States than it is in this country, is of more than usual interest. The notorious "army-worm" appears in a new character, viz. as destructive to cranberries, which form an important feature in the productions of the States. Various additional enemies to forest-trees are treated on by Dr. Packard. A long chapter (by Drs. Anderson and Barnard) is devoted to the "cotton-worm," in which (in addition to interesting biological information) elaborate contrivances for distributing arsenical solutions are described. Dr. McMurtrie contributes an exhaustive report on the examination of raw-silk "grown" in the States. From a scientific point of view the most valuable article is a posthumous one, by the late Dr. J. S. Bailey, on the North American *Cossidæ* (or "goat-moths"), illustrated by two very excellent plates.

WE cannot speak too highly of the work and management of the Sheffield Free Libraries. One-quarter of their rate is mortgaged to meet the debt incurred at starting; yet more than one-seventh of its entire amount is spent in books. Practically this is more than one fifth of the available income; and since, besides the central library, there are three large active branches as well as a museum and observatory, it shows a careful economy in the expenses. The committee regret in their report that their income will not allow them to further increase their premises in both size and number. In many libraries the income is almost swallowed up in the expenses of a single costly establishment. The management of Sheffield, therefore, combined with the excellence of the collection of books which its catalogue displays, deserves support from any who feel an interest in intellectual progress or wholesome and harmless recreation.

THE Norwegian naturalist, Dr. S. A. Buch, has been commissioned by his Government to prosecute practical scientific researches as to the herring fisheries of Norway during the present year, according to the instructions of the Society for Promoting the Norwegian Fisheries in Bergen.

ON January 24, at 11.25 p.m., a splendid meteor was observed at Husqvarna in Sweden. The meteor passed rather slowly in a southerly direction, leaving a lustrous trail behind about a yard long. It was nearly the size of an ordinary cheese-plate. After a few seconds it burst with a loud report, emitting a light green lustre. The fragments seemed to turn red and soon vanished.

WITH the January number the Austrian *Monatschrift für den Orient* has increased its size, and introduced illustrations. It is also promised that scientific supplements will be occasionally issued.

MESSRS. HODDER AND STOUGHTON have issued a translation of the first volume (the only one yet published) of Dr. Rein's work on Japan—"Japan: Travels and Researches undertaken at the Cost of the Prussian Government"—of which we were able to speak in high terms in reviewing the original German edition. Altogether it is probably the most solid contribution

which has been made to a knowledge of Japan and its people; the translation seems to us to be well done.

THE next evening lecture of the Society for the Encouragement of the Fine Arts will be delivered by Mr. Lennox Browne, at the rooms of the Society in Conduit Street, on February 14. It will be entitled "Science and Singing," and will be elucidated by vocal and other illustrations.

FROM the *Adelaide Express and Telegraph* of December 31, 1883, we learn that Mr. Clement L. Wragge was about to start an astronomical and meteorological observatory on his own account on the banks of the Torrens. Observations of the usual meteorological elements were to be commenced on Jan. 1, 1884. The meteorological instruments comprise mercurial barometers, a barograph, numerous self-registering and other thermometers by the best makers and Kew verified; besides rain-gauges, ozone tests, rain-band spectroscope, and other appliances used by Mr. Wragge at the Ben Nevis Observatory. He hopes to train an assistant, who will carry on the work during any prolonged absence. The house is to be called the Torrens Observatory, and is admirably situated on Stephens Terrace, Gilberton, two miles from Adelaide.

ON the proposal of M. de Lesseps, the Paris Geographical Society has decided to publish the biographies of all the French travellers of the present century.

THE *Journal of the Society of Arts* for February 1 contains two papers of special interest. One by Mr. J. G. Colmer, the Secretary to the Canadian High Commissioner, tells what the British Association will find in Canada on its visit in August next; the other is a paper of much practical value, by Mr. Thomas Fletcher, on coal-gas as a labour-saving agent in mechanical trades.

WE learn from a communication from Orkney that on January 27 at 3 a.m. the barometer fell to 27·508, and that the tide was unusually high. At Dundee the lowest record was 27·382 at 10.30 p.m. on the 26th, while the velocity of the wind is given at from fifty to sixty-five miles per hour. In Orkney a velocity of eighty-eight miles was recorded by the anemograph.

IT appears from the researches of M. Sokoloff that the water of the Neva at St. Petersburg, at a depth of 9 feet, is very pure when compared with the water supplied to other large cities. The matter in suspension in 1 cubic metre of water (in September and October) does not exceed 5·5 grm., and sometimes it is so small as to be less than 0·02 grm. The mineral matter dissolved varies from 31·0 to 38·1 grm., and the organic matters reach but 18·7 to 22·5 grm. The average for August and September is 20·4 grm. of organic matter and 31·6 of inorganic; for October, 21·7 and 33·9 grm. respectively.

CAPTAIN STUB, Corresponding Member of the Society of Arts at Smyrna, writes to Mr. Hyde Clarke that "the cold wave which was passing over America reached here last Sunday, January 21, and for Smyrna the cold was intense. I am told in exposed positions the thermometer went down to 10° below zero. At the point near the railway station I saw ice one inch thick. On the 24th the weather became milder."

THE additions to the Zoological Society's Gardens during the past week include a Macaque Monkey (*Macacus cynomolgus*) from India, presented by Dr. Harrison Branthwaite; a Bonnet Monkey (*Macacus sinicus* ♂) from India, presented by Mr. E. F. Shortt; a Quebec Marmot (*Arctomys monax*) from Virginia, U.S.A., presented by Mr. G. S. White; a Long-eared Owl (*Asio otus*) from Germany, presented by Master Owen Dallmeyer; a Water Rail (*Rallus aquaticus*), British, presented by Mr. T. E. Gunn; a West African Python (*Python sebæ*) from West Africa, presented by Capt. J. Grant Elliott; five European Tree Frogs (*Hyla arborea*) from France, presented by Miss E. Brunton; a European Tree Frog (*Hyla arborea*), South European, presented by the Rev. J. Stapledon Webber; a Rhesus Monkey (*Macacus rhesus*) from India, a Common Wolf (*Canis lupus*), European, a Fallow Deer (*Dama vulgaris* ♀), British, two Chattering Lories (*Lorius garrulus*) from Moluccas, two Vieillot's Firebacks (*Euplocamus vieilloti* ♂ ♀) from Malacca, deposited; a Sykes's Monkey (*Cercopithecus albigularis*), a Gray-cheeked Mangabey (*Cercocebus albigena* ♀) from West Africa, two Spotted Hyænas (*Hyæna crocuta* ♂ ♀) from South Africa, a Red-vented Parrot (*Pionus menstruus*) from Brazil, a Golden Eagle (*Aquila chrysaëtos*), a Tawny Eagle (*Aquila nævioides*), a White-tailed Eagle (*Haliaëtus albicilla*), a Cinereous Vulture (*Vultur monachus*), seven Knots (*Tringa canutus*), European, a Temminck's Snapper (*Macroclemmys temminckii*) from North America, purchased.

OUR ASTRONOMICAL COLUMN

THE COMET OF 1664.—"Cette comète de 1664," remarks Pingré, in introducing the description of it given in his "Cométographie," "a singulièrement exercé les presses des Imprimeurs," and that this statement was justified will be evident to any one who may consult Lalande's "Bibliographie," the catalogue of the library in the Observatory of Pulkowa, or the "Repertorium der Cometen-Astronomie," by Dr. Carl of Munich; in the latter will be found references to some eighty works, either treating specially upon this comet, or in which it is noticed in more or less detail. And further, as Mädler observes: "Lubienietsky hat über ihn allein einen ganzen Quartband geschrieben, der freilich für unsere Zwecke sich auf einige Seiten reducirt;" the volume here referred to is the first of the "Theatrum Cometicum."

This comet appears to have been discovered in Spain as early as November 17. Huyghens observed it at Leyden on December 2, while the observations of Hevelius at Dantzic, which have been used exclusively in the determination of the orbit, commenced on December 14, and it was generally observed in France and Italy about the same time. Observations properly so-called do not appear to have been made in this country, and on scanning the long list of publications enumerated by Carl we find, in addition to a notice by J. Ray in the *Philosophical Transactions* for 1707, only two works named as having been printed here: (1) "An Astronomical description of a comet as it appeared in new Ingland, in the year 1664;" and (2) "The blazing star, or a discourse of Comets. In a letter from J. B. to T. C. concerning the late comet." Flamsteed was then an ailing youth, and though given to astronomical exercises he has no reference to the comet in question. Indeed, in his account of his early life we read: "I had now completed eighteen years, when the winter (that of 1664-1665) came on and thrust me again into the chimney, whence the heat and the dryness of the preceding summer had happily once before withdrawn me;" and he thus attended rather to calculation from Street's "Caroline Tables," which he had just procured, than to observations.

The comet was not suffered to remain without notice by Samuel Pepys, and we find several references to it in his "Diary," which it may not be quite without interest to examine. Pepys records the old style dates, but we reduce them to the present reckoning. The first notice of the comet is on December 27, and runs thus: "Mighty talk there is of this comet that is seen a' nights; and the King and Queene did sit up last night to see it, and did it seems. And to-night I thought to have done so too; but it is cloudy, and so no stars appear. But I will endeavour it." On the night of December 26 the comet would rise in London just before eleven o'clock, and would be on the meridian at two o'clock at an altitude of less than nine degrees, in R.A. 126°·4, and declination 30°·0 south, distant from the earth 0·193. The apparent length of the tail (37°) mentioned by Carl, assigns a real length of 43,000,000 miles, if it were in the line of the radius-vector. On December 31 we read: "My Lord Sandwich this day writes me word that he hath seen (at Portsmouth) the comet, and says it is the most extraordinary thing he ever saw." On January 3 Pepys says: "I saw the comet, which is now, whether worn away or no I know not, but appears not with a tail, but only is larger and duller than any other star, and is come to rise betimes, and to make a great arch, and is gone to quite a new place in the heavens than it was before; but I hope in a clearer